Drinking Water Advisory Committee Report

NOVEMBER 6, 2000

Office of the Chief Medical Officer of Health

Manitoba Health

Committee Chair's Introduction (Transmittal letter)

Honourable Dave Chomiak, Minister of Health and Honourable Oscar Lathlin, Minister of Conservation:

I am pleased to submit to you the final report and recommendations of the Manitoba Drinking Water Advisory Committee.

Until recently, most Manitobans, like most Canadians, had taken for granted the safety of their drinking water. The events in Walkerton, Ontario earlier this year alerted all of us to the potential seriousness of bacterial contamination. These events have also reminded us of the importance of effective public health programs. No doubt, many lessons will be learned from the Walkerton enquiry. Meanwhile, public health officials across the country have been stimulated to review their own water programs, particularly with respect to the identification of bacterial contamination and appropriate follow-up action.

On June 9, 2000, the Drinking Water Advisory Committee was established by the Ministers of Health and Conservation to conduct a review-audit of the reporting and follow-up procedures for bacterial testing of all water systems in Manitoba. Our task was to make recommendations on sampling and bacterial testing of drinking water as well as reporting and appropriate follow-up action. Other aspects of drinking water quality, such as the protection of our drinking water sources and the state of the infrastructure of water systems were not included in the scope of our mandate.

The scope of the mandate of the Committee has allowed us to make recommendations to reduce the risk of waterborne illness in the short term. It has also allowed us to make recommendations to provide information to guide long term planning to protect our drinking water sources and to improve the structure and processes of our drinking water systems.

This review does not constitute an audit in the formal sense. Given the timeframe of the task, it was not feasible to conduct original research or a full audit all Manitoba systems. The Committee drew on the experience and expertise of its members as well as previously published data, reports, laws and policies.

Drinking water systems in Manitoba can be classified as public, semi-public, or private. Public water systems (about 350) refer to those systems that typically serve cities or towns and have 15 or more connections. Semi-public water systems (about 2,000) have fewer than fifteen connections but still serve the public. This category includes schools, daycares, community wells and restaurants, which use their own wells. Finally, private water systems (about 35,000 - 50,000) refer primarily to wells owned by private citizens for their own domestic uses.

The main principles and content of the report's 29 recommendations can be described under five statements:

1. **We need one drinking water coordinating centre in Manitoba.** The management of the drinking water in Manitoba is shared between many departments and divisions. To coordinate the complex activities of the Province's drinking water program and to communicate with the public and other government jurisdictions in a clear and consistent way, it is recommended that the Government of Manitoba establish one drinking water coordinating centre.

2. **We need to enhance the Province's program for private well water testing.** Private wells share public water sources. Well water is a potential source of contamination as well as an important indicator of the quality of our aquifers. Testing and follow-up action of private wells should remain the responsibility of the well owner, but there is a need to encourage regular testing and to monitor trends and patterns of test results. Recognizing the private and public benefits of regular testing and the potential barrier of the costs of testing, the Committee has recommended enhanced education of private well owners and a subsidization of testing costs. Specifically, our Committee has recommended that the costs of such tests be 70% subsidized by the Province (consistent with current subsidy of public water system testing) and that all test results be available for pattern surveillance in a provincial database.

3. **We need to regulate and monitor semi-public water systems and strengthen the regulation and monitoring of public water systems.** Facilities which provide drinking water to the public by a small system (less than 15 connections) are not currently regulated and monitored under the Public Health Act. It is recommended that such systems come under the same regulations which apply to the larger public water systems. Such regulations include mandatory testing and reporting procedures. The same subsidy rate (70%) should apply for costs of testing. Strengthening of the reporting requirements and other regulations and guidelines for the public water systems have also been recommended, such as the requirement for reporting of a positive bacterial test result to the "live voice" of a public health official. A provincial database has been recommended for surveillance and monitoring of semi-public and public systems.

4. **We need to improve education, training, communication and standards in all aspects of the Manitoba drinking water program.** The establishment of one drinking water coordinating centre in Manitoba would facilitate consistent education and communication, as well as training and standards. Recommendations include the development of education and training programs and materials for private well owners as well as semi-public and public system operators. It is recommended that there be standards and accreditation for laboratory testing as well as standards for information which is included in the reporting of test results.

5. **We need adequate resources to make the system work better.** To support the enhanced activities and additional needs of private well owners and water system operators and to enforce the enhanced regulation of semi-public and public water systems, it is recommended that resources be made available to produce improved educational materials and to recruit and retain appropriate numbers of additional staff. Public health inspectors or similarly qualified personnel are needed to assist water system owners and operators and to enforce a new drinking water program. They will need to be supported by sufficient technical and support staff. Finally, additional resources are required to build a provincial water testing database system and to support administrative and operational processes.

Although serious waterborne disease in Manitoba has not been a major problem for some time, the need to be vigilant with respect to our drinking water - a basic prerequisite of public health and safety - is clear. It is my opinion that the implementation of these recommendations would significantly improve the safety of drinking water in Manitoba and further protect the health of Manitobans.

This report is presented by me as chair of the Drinking Water Advisory Committee, but it is the product of the collaboration of many. I would like to thank them sincerely for their very hard work and very good work.

Thank you for the opportunity to lead this task and to deliver this report to you.

Yours sincerely,

Joel Kettner MD MSc FRCSC FRCPC
Chief Medical Officer of Health
Chair, Manitoba Drinking Water Advisory Committee

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I. EXECUTIVE SUMMARY AND LIST OF RECOMMENDATIONS

"Manitoba has an abundance of good quality groundwater. However, under certain conditions, bacteria and other tiny organisms may be introduced into the groundwater and wells. Most of the time, the presence of these "germs" do not cause serious illness. In some cases, however, people can become every ill from drinking contaminated water. E. coli 0157 is one type of bacteria that can cause severe disease as well as death. Although water has never been identified as a cause of E. coli 0157 infection in Manitoba, the large outbreak in Ontario has alerted all Canadians to this possibility."

Office of Chief Medical Officer of Health
OCMOH Fact Sheet, June 9, 2000

On June 9, 2000, the Drinking Water Advisory Committee was established by the Ministers of Health and Conservation to conduct a review of reporting and follow-up procedures for bacterial testing of all water systems in Manitoba.

The Drinking Water Advisory Committee was directed to review and provide advice on:

- appropriate drinking water sampling frequencies and quality assurance;
- the accessibility of bacterial testing for private wells and other sources of drinking water not currently monitored under *The Public Health Act*;
- the reporting requirements of test results;
- the expected action of well operators / owners and others if advised of bacterial presence in test results;
- the expected follow-up for private wells and all other drinking water systems, especially those with a history of problems;
- changes in laws, regulations, policies, guidelines and / or methods which are required to ensure and / or allow the above items to be carried out in a timely fashion; and
- the education / information requirements of private well owners and operators.

There are more than 350 public drinking water systems and an estimated 50,000 water wells. There are 68 water plants for First Nation communities. It is estimated that there are 20 hospitals, 70 daycares, 100 schools, 800 restaurants, 300 community wells and an additional 300 – 500 other operators of semi-public water systems using well water.

Manitoba's *Public Health Act* is the regulatory authority governing domestic and public water supplies which includes wells, treatment plants and distribution systems.

Manitoba's drinking water systems were reviewed by establishing subcommittees, implementing a work plan and assessing the processes and procedures of three critical elements of the drinking water system, that is:

a. the sampling of the drinking water for bacteria,
b. the laboratory testing of water samples for bacteria and reporting, and
c. the follow-up / remedial response to positive bacterial test results.

For the purposes of this report, the water systems in Manitoba were "defined" as follows:

a. *private water systems*, e.g. wells and cisterns for domestic drinking water purposes;
b. *semi-public water systems*, which serve water to the public but are not part of public distribution systems with 15 or more connections. Examples include schools, personal care homes, day care centres, hospitals, community wells, restaurants.
c. *public water systems*, that is municipal water systems with 15 or more connections.

The *Committee* has made 29 recommendations which address five main points:

1. **We need one drinking water coordinating centre in Manitoba.** The management of the drinking water in Manitoba is shared between many departments and divisions. To coordinate the complex activities of the Province's drinking water program and to communicate with the public and other government jurisdictions in a clear and consistent way, it is recommended that the Government of Manitoba establish one drinking water coordinating centre.

2. **We need to enhance the Province's program for private well water testing.** Private wells share public water sources. Well water is a potential source of contamination as well as an important indicator of the quality of our aquifers. Testing and follow-up action of private wells should remain the responsibility of the well owner, but there is a need to encourage regular testing and to monitor trends and patterns of test results. Recognizing the private and public benefits of regular testing and the potential barrier of the costs of testing, the Committee has recommended enhanced education of private well owners and a subsidization of testing costs. Specifically, our Committee has recommended that the costs of such tests be 70% subsidized by the Province (consistent with current subsidy of public water system testing) and that all test results be available for pattern surveillance in a provincial database.

3. **We need to regulate and monitor semi-public water systems and strengthen the regulation and monitoring of public water systems.** Facilities which provide drinking water to the public by a small system (less than 15 connections) are not currently regulated and monitored under the Public Health Act. It is recommended that such systems come under the same regulations which apply to the larger public water systems. Such regulations include mandatory testing and reporting procedures. The same subsidy rate (70%) should apply for costs of testing. Strengthening of the reporting requirements and other regulations and guidelines for the public water systems have also been recommended, such as the requirement for reporting of a positive bacterial test result to the "live voice" of a public health official. A provincial database has been recommended for surveillance and monitoring of semi-public and public systems.

4. **We need to improve education, training, communication and standards in all aspects of the Manitoba drinking water program.** The establishment of one drinking water coordinating centre in Manitoba would facilitate consistent education and communication, as well as training and standards. Recommendations include the development of education and training programs and materials for private well owners as well as semi-public and public system operators. It is recommended that there be standards and accreditation for laboratory testing as well as standards for information which is included in the reporting of test results.

5. **We need adequate resources to make the system work better.** To support the enhanced activities and additional needs of private well owners and water system operators and to enforce the enhanced regulation of semi-public and public water systems, it is recommended that resources be made available to produce improved educational materials and to recruit and retain appropriate numbers of additional staff. Public health inspectors or similarly qualified personnel are needed to assist water system owners and operators and to enforce a new drinking water program. They will need to be supported by sufficient technical and support staff. Finally, additional resources are required to build a provincial water testing database system and to support administrative and operational processes.

List of Recommendations

I. General Recommendations

1. *The findings and recommendations of this report be applied equally to all Manitobans and all lands in Manitoba, including those of extended communal families and land reserved for First Nations.*

2. *The Province adopt the bacterial guidelines from "The Guidelines for Canadian Drinking Water Quality" as the standard for all drinking water systems in Manitoba.*

3. *A provincial drinking water coordinating centre be established by the Government of Manitoba. The provincial drinking water coordinating centre would be responsible for:*

    - *coordinating the implementation of recommendations of this report which are approved,*
    - *coordinating education, training and information services,*
    - *coordinating drinking water quality monitoring,*
    - *maintaining a provincial drinking water data base,*
    - *updating and making recommendations for drinking water legislation,*
    - *coordinating the resolution of site specific and special circumstances drinking water problems,*
    - *working with First Nations and responsible federal agencies to address drinking water issues and programs on First Nation lands, and*
    - *addressing any other issues of importance to the safety and supply of drinking water in Manitoba.*

4. *The Water Supplies Regulation, MR 330/88R or other appropriate legislation be amended to require all laboratories and others conducting bacterial tests on drinking water to provide all results (positive or negative) directly to the Province including private, semi-public and public drinking water supplies.*

5. *The Water Supplies Regulation MR 330/88R be amended to require the establishment and maintenance of a secure provincial drinking water quality data base which has the ability to track all drinking water test results and identify or project public safety and water quality problems and trends.*

6. *The provincial drinking water quality data base be governed by fair information practices.*

    a. *maintaining the confidentiality of individual personal information;*
    b. *limiting the information collected and entered into the data base to the type and amount necessary to accomplish the purpose for which it is being collected;*
    c. *advising the public of the existence of the database, what it contains, how it is used, whether it is linked to any other data, who it may be given to outside of government, etc.;*
    d. *retaining the information for only as long as is necessary to accomplish the purpose.*

7. *The Province:*

   a) *make the drinking water quality data base accessible electronically, to designated provincial agencies, staff and federal authorities;*
   b) *generate regular reports from among other sources, accredited laboratory weekly data downloads which have been appropriately screened and corrected for reliability of the information; and*
   c) *make public, on a regular basis, reports of specific test results or summaries of test results (where appropriate) for private, semi-public and public drinking water systems.*

8. *The Province, in partnership with appropriate government departments and non-government organizations, develop an education course for the owners of private water supplies on the topic of sampling, testing and follow-up actions to be taken as part of general program on operating and servicing wells, cisterns and surface drinking water systems.*

9. *The Province, in partnership with education and business stakeholders, develop a training program and / or certification process for persons in the business of servicing wells (including shock chlorination procedures).*

10. *The Province support the process already in progress to establish mandatory training, certification and routine up-dating and re-certification of water treatment plant operators to ensure they acquire and maintain appropriate levels of knowledge and skills with respect to sampling, testing and follow-up action.*

11. *The Province develop a coordinated information program which would, among other things:*

   - *prepare information packages, including videos, on such topics as sampling, testing and remedial actions for distribution to private well owners and municipal offices;*
   - *ensure standardized information is available across all government departments and other information sources so that response to requests for assistance is consistent;*
   - *ensure the information is simple to understand, and the recommended actions are easy to understand,*
   - *communicate to the public and health professionals acceptable bacteriological drinking water standards which are easily understood;*
   - *create and maintain a drinking water web site on which all educational fact sheets and other information, e.g., sampling procedures, would be placed; and*
   - *direct, as far as possible, people to one source in government for information regarding contaminated wells.*

12. *The Province require laboratories, when reporting bacterial test results, to provide information sheets (prepared by the Province) that include directions on:*

   - *interpreting the meaning of test results,*
   - *further testing,*
   - *appropriate actions to take with contaminated wells and other systems, and*
   - *whom to contact for assistance.*

13. *The Province establish a task force to review, in detail and report back within 3 months, the staffing and financial resources required, over the next 3 years, to implement the recommendations of this report.*

In general, the Drinking Water Advisory Committee recognizes the need to strengthen and increase the level of resources allocated regionally and centrally to maximize the safety of Manitoba's drinking water. The task force should give particular attention to the resources required for:

- *preparing, distributing and explaining educational and informational materials on drinking water quality and testing;*
- *sampling, monitoring and inspection to increase the safety and quality of all drinking water supplies in Manitoba;*
- *establishing and maintaining a provincial drinking water data base and reporting capability.*
- *test result interpretation, water system inspection and remediation of contaminated systems and other follow-up actions;*

II. Recommendations Related to Drinking Water Sampling

14. *The Province enhance educational programs for the sampling and testing of private wells and aquifer water quality to protect Manitoba's groundwater supplies and enhance public health and safety.*

15. *The Province, under The Public Health Act or Water Supplies Regulation, MR 330/88R:*

a. *establish mandatory sampling frequency schedules for all semi-public drinking water supplies; and*
b. *empower the medical officer of health to require additional sampling, as deemed appropriate.*

16. *The Province require that established drinking water sampling frequencies for relevant semi-public water supplies be made a condition of the permit issued by the medical officer of health, public health inspector or other provincial authority.*

17. *The Province, under The Public Health Act or Water Supplies Regulation, MR 330/88R:*

a. *establish mandatory sampling frequency schedules for all public drinking water systems, including representative sampling from all water distribution systems in particular, regional or grid systems;*
b. *ensure the frequencies have built-in safeguards;*
c. *empower the medical officer of health to require additional sampling as deemed appropriate; and*
d. *require the sampling frequencies to be reviewed on a regular basis, e.g., every 3 years.*

18. *The province establish procedures to monitor compliance with existing sampling frequencies guidelines and future mandatory schedules for all drinking water supply owner / operators.*

19. *The Province subsidize bacteriological testing of private drinking water systems (e.g., wells, cisterns, dug-outs), at the same level as municipal water testing (70% province 30% householder), for at least one sample annually and more often if recommended by the medical officer of health or the public health inspector.*

20. *The Province fully subsidize re-testing due to positive results, conditional upon approval by designated provincial staff (e.g., public health inspector, environment officer, medical officer of health) who will ensure appropriate re-sampling, testing or any remedial action which should be taken.*

21. *The Province subsidize bacteriological testing of semi-public systems at the same level as municipal water testing (70% province 30% owner) for all prescribed samples.*

III. Recommendations Related to Laboratory Testing and Reporting

22. *The Province ensure all Manitoba communities have access to appropriate drinking water testing resources. Where remoteness or other factors limit access by communities to accredited laboratories:*

    a. *on-site testing capabilities [equipment, training, reporting and staffing] should be considered and subsidized at the same rate provided others; and*
    b. *where on-site testing of drinking water is recommended it should only be conducted in accordance with approved methodologies, have adequate on-going quality control monitoring, have technicians with adequate training and have organizational support and management of the programs and follow-up of results.*

23. *The Province require, by legislation, that all drinking water testing, [excluding approved on-site testing] be conducted by accredited laboratories using accredited bacteriological tests including total coliforms, fecal coliforms, heterotrophic plate count, E. coli and other specific pathogens of public health concern.*

24. *The Province establish a drinking water bacteriological test results reporting protocol, for all drinking water, which is to be followed by laboratories and on-site testing facilities. Such a protocol will establish, based upon the level of public safety at risk, to whom the results are to be forwarded, the time lines for reporting and the methods of communicating the test results.*

    Pending establishment of the protocol and provincial drinking water coordinating centre, positive bacteriological test results from semi-public and public drinking water supplies be reported as soon as practical to the person submitting the sample for testing, and in-person to the "live voice" of a local public health authority, i.e., a public health inspector or medical officer of health.

25. *The Province, in consultation with laboratories, establish a standard set of simple and clear interpretations of drinking water test results for private and semi-public water systems for use by laboratories in reporting back to those persons submitting a water sample for testing.*

26. *The Province work with laboratories to develop standardized forms / formats for the reporting of all drinking water bacteriological test results.*

27. *The Province develop one standard decision flow chart (algorithm) to be provided to well owners with their bacterial drinking water test results which will:*

   a. *outline recommended actions for well owners based on the type of well and level of contamination, and*
   b. *provide information on how to get further assistance from public health inspectors and others so that specific advice can be given on a case-by-case basis, when requested by the well owner.*

28. *The Province develop a program to track positive bacteriological test results to determine if there is widespread bacterial contamination of water supplies within an aquifer and have procedures in place to ensure appropriate action is taken by public health officials when such widespread contamination is suspected.*

IV. Recommendations Related to Actions After Test Results

29. *The Province develop protocols for follow-up actions for the various semi-public water supplies which will:*

   a. *outline recommended actions and procedures to be followed based on type of water source, facility and operation and level of contamination, by the owner / operator and provincial staff, and*
   b. *provide the owner / operator with points of contact for assistance.*

   Pending development of the protocol, the Province require all owner / operators of semi-public water supplies to immediately contact the local public health inspector or medical officer of health if a drinking water test sample result is positive for bacterial contamination to ensure parallel tracking and monitoring of follow-up action.

II. DRINKING WATER ADVISORY COMMITTEE TERMS-OF-REFERENCE

Purpose:

The Drinking Water Advisory Committee was charged with advising the Government of Manitoba on changes in legislation, policies, guidelines or other matters which are recommended so that all drinking water in Manitoba is appropriately sampled and tested for bacterial contamination and that appropriate reporting, action and follow-up occurs to improve public safety in a timely fashion.

Objectives:

The Drinking Water Advisory Committee was directed to review and provide advice on:

- appropriate drinking water sampling frequencies and quality assurance;
- the accessibility of bacterial testing for private wells and other sources of drinking water not currently monitored under *The Public Health Act*;
- the reporting requirements of test results;
- the expected action of well operators / owners and others if advised of bacterial presence in test results;
- the expected follow-up for private wells and all other drinking water systems, especially those with a history of problems;
- changes in laws, regulations, policies, guidelines and / or methods which are required to ensure and / or allow the above items to be carried out in a timely fashion; and
- the education / information requirements of private well owners and operators.

Scope of Work:

The *Committee* was to pursue these objectives for all drinking water supplies in Manitoba. In areas of federal responsibility, the Committee was to seek input from Health Canada to ensure on-reserve water systems and other federally regulated water supplies were included.

Reporting Lines and Timing:

The *Committee* was directed to report jointly to the Ministers of Health and Conservation by the fall of 2000.

Methods of Work:

To carry out its responsibilities the *Committee* was empowered to establish subcommittees. Chairs of subcommittees were all government employees, but members of the sub-committees included non-government members.

For practical reasons, the committee based its considerations on pre-existing data, reports and reviews, and the expertise and experience of its members.

The *Committee* agreed it would determine its advice through consensus, but would forward other policy options for consideration if necessary.

III. DRINKING WATER ADVISORY COMMITTEE MEMBERSHIP

Dr. Joel Kettner, Chief Medical Officer of Health, MB Health (Chairperson)
Serge Scrafield, Assistant Deputy Minister, Mb Conservation (Vice-chairperson)

Manitoba Health:

Dr. Greg Hammond, Director, Public Health Branch
James Drew, Manager, Environmental Health Unit
Dr. Jim Popplow, Environmental Medical Officer of Health
Dr. Anna MacDonald, Interlake Regional Medical Officer of Health
Dr. Timothy Hilderman, Medical Officer of Health – Special Projects

Manitoba Conservation:

Don Rocan, P. Eng., Environmental Approvals Branch
Norbert Berard, Senior Operations Consultant, Environmental Operations Division
Ken Rapinchuk, Selkirk Public Health Inspector/Environmental Inspector

Manitoba Agriculture and Food:

Dr. Gopi Nayar, Manager Microbiology, Veterinary Services Branch
Ken McGill, Manager, Agricultural Resources Section

Manitoba Aboriginal and Northern Affairs:

Randy Sigurdson, Technical Consultant, Community Support Services

Manitoba Intergovernmental Affairs:

Dick Menon, General Manager, Water Services Board

Health Canada:

Peter Rogers, Regional Environmental Health Manager

Staff Resources:

Shauna Martin, Director, Policy Management Secretariat, Executive Council
Tammy Gibson, A/Manager, State Of Environment Reporting, Mb Conservation
William [Bill] Barto, Sustainable Resource Management Branch, Mb Conservation
Tracey Roberts, Office of the Chief Medical Officer of Health
Mal Chikowski, Administrative Officer, Legislative
Marie Myndzak, Public Health Branch, Mb Health

IV. ORGANIZATIONAL STRUCTURE AND GENERAL WORK PLAN

The Drinking Water Advisory Committee undertook its responsibilities by:

1. establishing subcommittees to address its objectives,
2. having each subcommittee implement a work plan, with the intent of providing for the review and approval of the Drinking Water Advisory Committee:
   a. a set of draft recommendations,
   b. a list of supporting background materials,
   c. the identification of other issues and concerns which should be addressed subsequently.

The following subcommittees were established:

1. Subcommittee to review drinking water sampling,
2. Subcommittee to review drinking water laboratory testing and reporting, and
3. Subcommittee to review drinking water action.

All subcommittees reported to and received their direction from the Drinking Water Advisory Committee.

Subcommittee chairpersons were allowed to invite people from within or outside government to become members of the subcommittee, as deemed appropriate by the Chairperson of the subcommittee.

Each Subcommittee was provided with a set of objectives and general tasks to guide their deliberations. The membership, objectives and work tasks of each subcommittee are outlined in the following section.

A. Subcommittee to Review Drinking Water Sampling:

Membership:

Norbert Berard, Senior Operations Consultant, Envir. Operations Div., Mb Conservation (Chairperson)
Dr. Jim Popplow, Environmental Medical Officer of Health, Mb Health (Vice-chairperson)
Don Rocan, P. Eng., Environmental Approvals, Mb Conservation
Ken McGill, Manager, Agricultural Resources Section, Mb Agriculture and Food
Peter Rogers, Regional Environmental Health Manager, Health Canada
Richard Pasquill, Agri Water Supervisor, Water Services Board, Mb Intergovernmental Affairs
Laurie Frost, Agricultural Hydrogeologist, Mb Conservation
Ken Mattes, President, Northern Water and Environmental Training
Joan Warbeck, Public Health Nurse, Eastman Regional Health Authority
Lisbeth Liebgott, Water Efficiency Coordinator, Mb Conservation
Nicole Armstrong, Environment Officer, Mb Conservation

Objectives and Tasks: The Subcommittee's objectives were to review:

- drinking water sampling frequency and quality assurance;
- the accessibility of bacterial sampling/testing for private wells and other sources of drinking water not currently monitored under *The Public Health Act*; and
- the education and information services available to private well owners and operators.

The Subcommittee's tasks were:

1. to identify existing types of water supplies in Manitoba;
2. to review the sampling frequency levels / schedules established / required for each type of water supply and determine:
    a. whether the sampling and levels of frequency were legislated, set by policy or voluntary,
    b. the monitoring and compliance rates with frequency schedules,
    c. whether, in the opinion of the subcommittee, there was adequate monitoring of sampling requirements including staffing resources, and
    d. whether, in the opinion of the subcommittee, existing sampling requirements / frequency were adequate to protect public health;
3. to identify for all types of water supplies in Manitoba:
    a. the various costs associated with the sampling and testing of drinking water supplies, and
    b. other factors which may affect accessibility to drinking water sampling and testing;
4. to describe the education and information programs and services, related to sampling, that were in place for owners – operators of all types of drinking water supplies;
5. to indicate whether, in the opinion of the subcommittee, the costs for sampling and testing drinking water was a constraint to ensuring adequate sampling and testing of various drinking water supplies,
6. to indicate whether, in the opinion of the subcommittee, the drinking water education and information programs and services were adequate;
7. to identify information data base issues;
8. to identify sampling and education issues respecting situations of special circumstances, such as flooding, failure of chlorination and heavy rains which may have implications to drinking water safety;

9. to make recommendations for changes in laws, regulations, policies, costs, programs and services to:
   a. correct any identified constraints or barriers to adequate sampling and testing of drinking water supplies,
   b. enhance the effectiveness of existing drinking water data bases and educational and information programs and services; and
10. to identify issues and concerns related to the accessibility to and frequency of drinking water sampling and testing, monitoring of sampling, the education of owners / operators of drinking water supplies and special circumstances which should be studied further or addressed at a later date.

B. Subcommittee to Review Drinking Water Laboratory Testing and Reporting:

Membership:

Dr. Gregory Hammond, Director, Public Health Branch, Mb Health (Chairperson)
Heather McLaren, Director, Legislative Unit, Mb Health
Doug Milley, Scientist, Virology Section, Cadam Provincial Laboratory, Mb Health
Shirley Dzogan, Manager, Environmental Microbiology, Enviro-Test Laboratory
Ed Sorba, Water Quality Specialist, Mb Conservation
Ken McGill, Manager, Agricultural Resources Section, Mb Agriculture and Food
Tammy Gibson, A/Manager, State of Environment Reporting, Mb Conservation

Objectives and Tasks: The Subcommittee's objectives were to review:

- the quality assurance of laboratory testing; and
- the reporting requirements of test results.

The Subcommittee's tasks were:

1. to review and report on the adequacy of existing laboratory testing methods and capabilities;
2. to outline existing reporting requirements of normal and abnormal test results and indicate:
    a. whether the reporting requirements were legislated, set by policy or voluntary,
    b. whether there were built in reporting process / procedure safeguards;
    c. the monitoring and compliance rates for reporting requirements,
    d. whether, in the opinion of the subcommittee, there was adequate monitoring of reporting requirements including staffing resources, and
    e. whether, in the opinion of the subcommittee, existing reporting requirements were adequate to protect public health.
3. to identify information data base issues;
4. to identify laboratory and reporting issues respecting situations of special circumstances, e.g., flooding, failure of chlorination, heavy rains which may have implications to drinking water safety;
5. to make recommendations for changes in laws, regulations, policies, guidelines and methods to:
    a. correct any identified deficiencies,
    b. enhance the effectiveness or efficiency of existing laboratory testing methods, reporting processes and information data bases; and
6. to identify issues and concerns related to laboratory testing methods, reporting, confidentiality, liability and special circumstances which should be studied further or addressed at a later date.

C. Subcommittee to Review Drinking Water Action:

Membership:

Dr. Anna MacDonald, Interlake Regional Medical Officer of Health, Mb Health (Chairperson)
James Drew, Manager, Environmental Health Unit, Mb Health (Vice-chairperson)
Dr. Jim Popplow, Environmental Medical Officer of Health, Mb Health
Don Rocan, P. Eng., Environmental Approvals Branch, Mb Conservation
Rick Sokolowski, Eastern – Interlake Regional Supervisor, MB Conservation
Ken Rapinchuk, Selkirk Public Health Inspector/ Environmental Inspector, Mb Conservation
Lorne Clearsky, Medical Officer of Health, AMA, Interlake Tribal Council
Lucy Bonnett, Process Engineer, Water Services Board, Mb Intergovernmental Affairs
Rick Martel, Association of Manitoba Municipalities

Objectives and Tasks: The subcommittee's objectives were to review:

- the expected follow-up (to test results) for private wells and all other drinking water systems, especially those with a history of problems; and
- the expected action of well operators/owners and others if advised of bacterial presence in test results.

The subcommittee's tasks were:

1. to determine for each type of water supply in Manitoba:
   a. the established follow-up actions / procedures, including communications which were to be taken / followed when adverse test results were received,
   b. whether the follow-up actions / procedures, including communications were established by legislation, policy or are simply guidelines,
   c. whether there were built-in process / procedure safe guards,
   d. the level of monitoring and compliance with the established follow-up actions / procedures,
   e. whether, in the opinion of the subcommittee, there was adequate monitoring of existing follow-up actions / procedures,
   f. whether, in the opinion of the subcommittee, existing follow-up actions / procedures were adequate to protect public health;
2. to identify information data base issues;
3. to identify action issues respecting situations of special circumstances, such as flooding, failure of chlorination, heavy rains which may have implications to drinking water safety;
4. to make recommendations for changes in laws, regulations, policies, guidelines and methods to: a. correct any identified deficiencies, b. enhance the effectiveness or efficiency of existing follow-up actions / procedures, communications and information data bases; and
5. to identify issues and concerns related to follow-up actions / procedures including communications, special circumstances and information data bases which should be studied further or addressed at a later date.

V. MANITOBA'S DRINKING WATER SYSTEMS

Manitobans obtain their drinking water from either groundwater, that is, from an aquifer, including springs or surface water sources, such as lakes, rivers and rain run-off. This drinking water may be delivered by a private non-commercial, private commercial or public system, for example a home well, commercial water hauler or municipal facility. The system delivering the drinking water, therefore, may serve an individual household or a large town. Alternatively, they may use bottled water.

There are more than 350 public water systems and an estimated 50,000 dug or drilled water wells throughout Manitoba. Of the public water systems, 68 are water plants for First Nation communities. It is estimated there are 20 hospitals, 70 daycare, 100 schools, 800 restaurants, 300 community wells and an additional 300 – 500 other operators of "semi-public" water systems using well water.

Manitoba's *Public Health Act* is the regulatory authority governing domestic and public water supplies. The safety of drinking water and drinking water systems which includes wells, treatment plants and distribution systems are regulated under this Act, the Water Supplies Regulation 330/88 and supplemented by Manitoba Health and Environment Guideline 98-02.

For the purposes of this report, the various water systems in Manitoba have been defined and divided into three categories:

a. private water systems,
b. semi-public water systems and
c. public water systems.

A. Private Water Systems

Private water systems are individual domestic drinking water systems. The water is used for personal or family needs only. The sale of water is not permitted. The drinking water may or may not be chlorinated.

The typical types of private water systems and supplies, in Manitoba, are:

- wells (e.g., dug, drilled, sand point),
- pumped systems using surface water supplies (e.g., dugouts, river, lakes, springs), and
- cisterns using bulk water hauled to site.

Examples of typical users of private drinking water systems include:

- individual urban, rural and farm residences, and
- individual recreational cottages.

B. Semi-public Water Systems

Semi-public water systems are systems which:

a. provide drinking water to less than 15 connections, and
b. provide drinking water to the public, for example, to a hotel, school, hospital, correctional institution, construction camp, underground mine and extended communal family, exclusively by a well.

The water / service may be sold. The drinking water may or may not be chlorinated.

The typical types of semi-public water systems and supplies, in Manitoba, are:

- wells, and
- pumped / piped systems using groundwater and surface water supplies.

Examples of typical users of semi-public drinking water systems, in Manitoba, include:

- schools,
- day care centres, personal care homes, residential care facilities, including foster homes,
- hospitals and addiction treatment facilities,
- extended communal families,
- cottage subdivisions,
- trailer and mobile home parks,
- recreational camps and campgrounds both private and public,
- community facilities, including recreational centres, arenas, etc.
- hotels, resorts, lodges, bed and breakfasts and hostels,
- apartment buildings,
- provincial and federal tourist information centres, correctional institutions and other facilities under federal jurisdiction,
- mines and exploration camps,
- bulk water haulers and ice providers,
- food handling establishments,
- various other business establishments,
- businesses or facilities offering drinking water to the public,
- community drinking water loading stations and public springs and wells, and
- First Nations communities served by trucks, standpipes, cisterns, community well or piped system.

C. Public Water Systems

Public water systems are drinking water distribution systems with 15 or more service connections. The water / service may be sold. The water is chlorinated, as prescribed by regulation, unless exempted by the Minister.

Public water systems may use either groundwater (wells) or surface water sources (e.g., lakes and rivers).

Public drinking water systems, regardless of who they serve, may be:

- privately owned and operated,
- co-operatively owned and operated, or
- municipally owned and operated.

Examples and typical users of public drinking water systems, in Manitoba, include:

- cities, towns and villages,
- large rural residential subdivisions, and
- large recreational cottage subdivisions.

VI. GENERAL OBSERVATIONS AND RECOMMENDATIONS

A. Introduction, Scope of recommendation and bacterial standards

Manitoba's drinking water systems were reviewed in regards to the effectiveness of the process and procedures which govern and direct:

a. the sampling of the drinking water,
b. the laboratory testing of water samples and reporting of results and,
c. the follow-up / remedial response to positive bacterial test results.

The safety and quality of drinking water is a concern to all Manitobans and groundwater and surface water are public resources that need to be protected not only for the present but for future generations of Manitobans and Canadians. *It is therefore recommended that:*

1. ***The findings and recommendations of this report be applied equally to all Manitobans and all lands in Manitoba, including those of extended communal families and land reserved for First Nations.***

Presently, there are no legal standards for drinking water quality in Manitoba. A national guideline is available; each jurisdiction in Canada may choose to adopt any part of this guideline as a standard. Adopting guidelines as standards can strengthen the ability of government and other agencies to ensure that drinking water meets national quality parameters. *It is therefore recommended that:*

2. ***The province adopt the bacterial guidelines from "The Guidelines for Canadian Drinking Water Quality" as the standard for all drinking water systems, in Manitoba.***

B. Background, Current Situation and Recommendations

The workplans established for each subcommittee included a number of common topics, such as data bases, education, information and human resources. During the course of deliberations other common themes emerged having provincial implications to Manitoba's drinking water systems. The following addresses these common themes.

Coordinated Program: The management of drinking water in Manitoba is a shared activity between two main departments – Health and Conservation, but also includes others. Presently, there is no identified centre of responsibility or leadership for Manitoba's drinking water program. To address the need for a coordinated approach to the Province's drinking water program *it is recommended that:*

3. ***A provincial drinking water coordinating centre be established by the government of Manitoba. The provincial drinking water coordinating centre would be responsible for:***

- ***coordinating the implementation of recommendations of this report which are approved,***
- ***coordinating education, training and information services,***
- ***coordinating drinking water quality monitoring,***
- ***maintaining a provincial drinking water data base,***
- ***updating and making recommendations for drinking water legislation,***

- ***coordinating the resolution of site specific and special circumstances drinking water problems,***
- ***working with First Nations and responsible federal agencies to address drinking water issues and programs on First Nation lands, and***
- ***addressing any other issues of importance to the safety and supply of drinking water in Manitoba.***

Drinking Water Data: The Province of Manitoba presently does not formally monitor drinking water quality province-wide nor does the Province maintain a province-wide water quality data base for all drinking water systems. This constitutes a significant weakness in the protection of public health and the sustainability of provincial water resources. An active monitoring program and provincial data base would enhance the Province's ability to track drinking water bacterial contamination and allow the Province to anticipate, identify and prevent point-source drinking water and more widespread aquifer contamination.

While Manitoba Conservation stores all bacteriological information from public systems provided by Enviro-Test Laboratories in their monthly downloads, provincial data bases containing water quality information are incomplete. This is because the Province does not receive the analytical results of private and semi-private drinking water samples submitted to laboratories for testing. Semi-public water quality data bases are generally non-existent or contain sporadic information only gathered through various other government water sampling programs. Although Enviro-Test Laboratories monitor water quality of public water systems as a condition of their contract with Manitoba Health and Conservation, the Province does not maintain that data in an overall provincial water quality data base.

Other initiatives and systems have gathered data on drinking water quality. A three-year groundwater sampling program was initiated in 1999 to gain a better understanding of rural groundwater quality. This has resulted in the creation of a partial data base of private domestic well water quality. Recently, some localized well water sampling has also been carried out by the Province following receipt of information from public health programs that identified areas of potential bacterial contamination. The provincial campground program provides a comprehensive sampling program for drinking water and maintains a data base which includes an annual public report. By contrast, however, private campground operators are not required to submit samples and no data base is kept.

Although some rural municipalities have initiated a sampling protocol for community water loading stations, the information is usually retained locally. The existence of sampling data may not be known to the local public health inspector. Water quality data from First Nations communities is managed by the federal government.

To address the need for the Province to monitor drinking water bacterial test results from all drinking water systems; *it is recommended that:*

4. ***The Water Supplies Regulation, MR 330/88R or other appropriate legislation be amended to require all laboratories and others conducting bacterial tests on drinking water to provide all results (positive or negative) directly to the Province including private, semi-public and public drinking water supplies.***

5. ***The Water Supplies Regulation MR 330/88R be amended to require the establishment and maintenance of a secure provincial drinking water quality data base which has the ability to track all drinking water test results and identify or project public safety and water quality problems and trends.***

6. ***The provincial drinking water quality data base be governed by fair information practices including:***

   a) ***maintaining the confidentiality of individual personal information;***
   b) ***limiting the information collected and entered into the data base to the type and amount necessary to accomplish the purpose for which it is being collected;***
   c) ***advising the public of the existence of the database, what it contains, how it is used, whether it is linked to any other data, who it may be given to outside of government, etc.;***
   d) ***retaining the information for only as long as is necessary to accomplish the purpose.***

7. ***The Province:***

   a. ***make the drinking water quality data base accessible electronically to designated provincial agencies, staff and federal authorities;***
   b. ***generate regular reports from among other sources, accredited laboratory weekly data downloads which have been appropriately screened and corrected for reliability of the information; and***
   c. ***make public, on a regular basis, reports of specific test results or summaries of test results (where appropriate) for private, semi-public and public drinking water systems.***

Education and information: In general, the education, training and information services on drinking water which are available in the Province are uncoordinated and inconsistent. For example, existing educational services and information for owners and operators of private domestic and semi-public drinking water systems are sparse and unevenly distributed throughout the offices of Manitoba Conservation, the Water Services Board, Manitoba Agriculture and Food, Water Conservation Districts, Manitoba Health and Health Canada. Also, there are no requirements for certification of private businesses that provide service to private domestic wells.

To address the need to enhance and coordinate education and training related to the sampling, testing and follow-up action of drinking water systems, *it is recommended that:*

8. ***The Province, in partnership with appropriate government departments and non-government organizations, develop an education course for the owners of private water supplies on the topic of sampling, testing and follow-up actions to be taken as part of general program on operating and servicing wells, cisterns and surface drinking water systems.***

9. ***The Province, in partnership with education and business stakeholders, develop a training program and / or certification process for persons in the business of servicing wells (including shock chlorination procedures).***

10. ***The Province support the process already in progress to establish mandatory training, certification and routine up-dating and re-certification of water treatment plant operators to ensure they acquire and maintain appropriate levels of knowledge and skill with respect to sampling, testing and follow-up action.***

11. ***The Province develop a coordinated information program which would, among other things:***

- ***prepare information packages, including videos, on such topics as sampling, testing and remedial actions for distribution to private well owners and municipal offices;***
- ***ensure standardized information is available across all government departments and other information sources so that response to requests for assistance is consistent;***
- ***ensure the information is simple to understand, and the recommended actions are easy to understand,***
- ***communicate to the public and health professionals acceptable bacteriological drinking water standards which are easily understood;***
- ***create and maintain a drinking water web site on which all educational fact sheets and other information, e.g., sampling procedures, would be placed; and***
- ***direct, as far as possible, people to the most appropriate source for information regarding contaminated wells.***

12. ***The Province requires laboratories, when reporting bacterial test results to provide standard information sheets (prepared by the Province) that include directions on:***

- ***interpreting the meaning of test results,***
- ***further testing,***
- ***appropriate actions to take with contaminated wells and other systems, and***
- ***whom to contact for assistance.***

Staffing and Financial Resources: The ability of the Province's staff to meet the demand and need for drinking water assessment and action has been limited for some time. Since the events in Walkerton and the heavy rains early this summer, the capacity of health inspectors and others to respond to the increased levels of concern and need has been increasingly challenged. Acceptance of many of these recommendations will result in the need for additional activities.

To address the need for increased capacity to manage the drinking water programs; *it is recommended that:*

13. ***The province establish a task force to review, in detail and report back within 3 months, the staffing and financial resources required, over the next 3 years, to implement the recommendations of this report.***

In general, the Drinking Water Advisory Committee recognizes the need to strengthen and increase the level of resources allocated regionally and centrally to improve the safety of Manitoba's drinking water. The task force should give particular attention to the resources required for:

- ***preparing, distributing and explaining educational and informational materials on drinking water quality and testing;***
- ***sampling, monitoring and inspection to increase the safety and quality of all drinking water supplies in Manitoba;***
- ***establishing and maintaining a provincial drinking water data base and reporting capability.***

- ***test result interpretation, water system inspection and remediation of contaminated systems and other follow-up actions;***

VII. SAMPLING OF DRINKING WATER

A. Introduction

The process of increasing bacterial safety of Manitoba's drinking water begins with taking water samples for the purpose of testing. Sampling, although a relatively simple activity, must be done correctly and at appropriate frequencies to provide greater assurance that test results are an accurate indication of the safety of drinking water.

In the review of drinking water sampling, the following were considered:

- sampling frequencies for each category of drinking water; and
- access to testing of drinking water

B. Background, Current Situation and Recommendations

Sampling Frequencies of Private Water Systems: Currently, there is no legislative requirement to sample private domestic drinking water systems. Most jurisdictions and educational information sources, however, suggest that all private domestic drinking water systems should be sampled at least annually for bacterial contamination.

The *Committee* recognized a dual aspect to private drinking water systems. On one hand they are privately owned and for private (personal or family) use. In this respect, they should not be "over-regulated". On the other hand, even though the public may not have access to the drinking water from a private well, the community (public) does share the water table or aquifer from which the water is drawn. Contamination of a private well may affect the water quality of the aquifer and could be a significant public health issue. Furthermore, test results from private wells are often the first, only and best means available to assess the quality of an aquifer and provide the opportunity for early recognition and interventions to protect the public and address the problem.

To address these issues, the *Committee* has recommended education and reduced financial barriers to encourage appropriate sampling and testing of private wells rather than mandating or regulating such practices.

However, if future experience indicates there are significant health risks resulting from failure of private well-owners to voluntarily test their wells, the question of mandatory sampling and testing should be re-examined.

To improve the voluntary rate of drinking water sampling and testing of private wells and to improve the monitoring of aquifer water quality, it is recommended that:

14. The province enhance educational programs for the testing of private wells and aquifer water quality to protect Manitoba's groundwater supplies and enhance public health and safety.

Sampling Frequencies of Semi-public Water Systems: There is currently no legislative requirement to sample water and there are no established expectations of sampling frequency. While sampling may be made a condition of permits issued by the medical officer of health, this is discretionary. Water sampling can therefore be described as voluntary for semi-public water systems.

Semi-public water systems provide drinking water to the public. Examples include schools, community wells and recreation centres. Failure to monitor the bacterial quality of such drinking water outlets could result in a significant risk to public health. The committee has concluded that future policy with respect to regulated testing should be consistent with the directive issued by the Chief Medical Officer of Health on August 3, 2000. At that time all such facilities were directed to test their water during the summer since the heavy rains of June and July. For facilities such as restaurants which receive permits or licenses from provincial officials, such requirements for testing should be a condition of the permit.

To reduce the risk associated with bacterial contamination of semi-public water systems; *it is recommended that:*

15. ***The province, under The Public Health Act or Water Supplies Regulation, MR 330/88R:***

- ***a. establish mandatory sampling frequency schedules for all semi-public drinking water supplies; and***
- ***b. empower the medical officer of health to require additional sampling, as deemed appropriate.***

16. ***The province require that established drinking water sampling frequencies for relevant semi-public water supplies be made a condition of the permit issued by the, public health inspector, medical officer of health or other provincial authority.***

Sampling Frequencies of Public Water Systems: Public water systems are regulated under *The Public Health Act.* The Water Supplies Regulation 330/88R states, among other things, that: "10(7) The water supplier shall ensure that water samples from the public water system are taken and submitted for analysis in accordance with procedure established by the medical officer of health." These procedures are outlined in Guideline 98-02, "Guidelines for Public Water Systems..." but are guidelines only and not mandatory sampling frequencies. Also Guideline 98-02 only establishes minimum requirements.

In the opinion of the *Committee*, the sampling frequencies outlined in Guideline 98-02 are not adequate for public health and safety and *it is therefore recommended that:*

17. ***The province, under The Public Health Act or Water Supplies Regulation, MR 330/88R:***

- ***a. establish mandatory sampling frequency schedules for all public drinking water systems, including the entire grid system of all water distribution systems;***
- ***b. ensure the frequencies have built-in safeguards;***
- ***c. empower the medical officer of health to require additional sampling as deemed appropriate; and***
- ***d. require the sampling frequencies to be reviewed on a regular basis, e.g., every 3 years.***

Monitoring of Sampling Frequencies: There is currently no routine monitoring of private domestic and semi-public water systems. While the northern regional office of Manitoba Conservation does monitor sampling frequencies of public water systems in its region there is no comprehensive monitoring system in place across the Province to ensure sampling guidelines are being followed. Although an electronic database has been established at Enviro-Test Laboratories for all public water systems, the data is only stored at Manitoba Conservation, but not actively monitored.

The lack of monitoring of sampling frequencies guidelines is a gap in Manitoba's drinking water program which needs to be addressed. To address this, *it is recommended that:*

18. ***The Province establish procedures to monitor compliance with existing sampling frequencies guidelines and future mandatory schedules for all drinking water supply owner / operators.***

Cost of testing water of private systems. Presently, the initial test and any required re-testing that may be required due to a positive bacteriological test result of a private domestic water system is born directly by the owner. The cost of a standard bacteriological test is in the range of $21 to $30 per sample. The degree to which this cost is a barrier to testing has not been evaluated in a rigorous way. Anecdotal evidence and observations on the frequency of testing since the total subsidy was removed several years ago suggests that the cost is a potential disincentive. Furthermore, the dual aspect of testing "private" wells to establish the quality of the "public" water source supports a policy of shared costs between the "private" owner/operator and the "public". Another justification is that a 30/70 split would make the cost of testing consistent with that of "public" water systems which are regulated by *The Public Health Act* and are subsidized at that rate.

To reduce the potential barrier that testing costs may have on the regular sampling and testing of private domestic water systems and to recognize the public health importance of such testing *it is recommended that:*

19. ***The Province subsidize bacteriological testing of private drinking water systems (e.g., wells, cisterns, dug-outs), at the same level as municipal water testing (70% province 30% householder), for at least one sample annually and more often if recommended by the medical officer of health or the public health inspector.***

20. ***The Province fully subsidize re-testing due to positive results, conditional upon approval by designated provincial staff (e.g. public health inspector, environment officer, medical officer of health) who will advise appropriate re-sampling, testing and any remedial action which should be taken.***

Cost of testing semi-public water systems. As with private domestic water systems, the owners of semi-public systems presently bear the full cost of all drinking water testing.

For the same reasons discussed above with respect to private water systems, the *Committee* agreed that the costs of testing may impose a significant disincentive to appropriate sampling. Furthermore the fact that water is provided to the public increases the importance of regular testing to reduce the risk of widespread illness if serious contamination should occur.

To maximize the regular testing of semi-private water systems and to address the potential barrier of testing costs, *it is recommended that:*

21. ***The province subsidize bacteriological testing of semi-public systems at the same level as municipal water testing (70% province 30% owner) for all prescribed samples.***

Public water systems. Owners / operators of public water systems have guidelines for sampling and testing which they are to follow. The province, however, does currently provide a subsidy, paying 70% of the cost of all specified testing. Owners of the public water systems do, however, pay for any testing

over the sampling frequency guideline. The *Committee* has not made further recommendations with respect to the costs of such testing.

Water systems on reserves: With respect to First Nations, testing costs are not a barrier as Health Canada, through First Nations and Inuit Health Branch, pays the entire cost of drinking water testing on reserves regardless of the type of water system being employed. The *Committee* has not made further recommendations with respect to the costs of such testing.

VIII. LABORATORY TESTING AND REPORTING

A. Introduction

Fundamental to safe drinking water are quality laboratory and on-site testing capabilities and an effective and prompt reporting procedure. This is to ensure unsafe drinking water situations can be recognized quickly and addressed swiftly by appropriate remedial actions and when appropriate, public warnings.

In the review of laboratory testing and reporting, the following was investigated:

- the adequacy of existing laboratory testing methods;
- laboratory testing capabilities; and
- the adequacy of existing procedures for reporting laboratory test results.

In conducting the review of Manitoba's bacteriological testing and reporting capabilities, the three principal laboratories, in Manitoba, were requested to provide information respecting:

- the accredited tests and test methods the laboratory performs;
- testing protocols and internal and external proficiency testing;
- reporting procedures for positive test results; and
- the capacity of the laboratory to conduct total coliform and E. coli tests.

B. Background, Current Situation and Recommendations

Laboratory accreditation, testing methods and capacities: There is only one accredited laboratory for bacteriological testing of drinking water in Manitoba, Enviro-Test Laboratories, which is accredited through the Standards Council of Canada, as recommended by the Canadian Association of Environmental Analytical Laboratories. The testing protocols and methods used by Enviro-Test Laboratories are summarized in Appendix 1.

The other two principal laboratories, Norwest Laboratories and BioQuest International are undergoing review for accreditation.

The private laboratories, in Manitoba, have indicated they can expand their capacity to meet rising and / or fluctuating demand for drinking water bacterial testing, as was experienced during the summer of 2000. The capacity of Enviro-Test Laboratories is approximately 1,000 samples per day and this capacity was not exceeded, although 700-800 samples were received during the peak of concerns about drinking water. Should other laboratories receive accreditation to do bacteriological drinking water testing, the overall testing capacity within the province would increase substantially.

Health Canada, First Nations and Inuit Health Branch, contract water testing on reserves to tribal councils and pay the cost of testing and fund operator training. While some of the testing is done at Enviro-Test Laboratories, approximately 90% of all testing is done in the field by trained water treatment plant operators using a Colilert test system. This system checks for total coliforms, and E. coli and is the same test system used by Enviro-Test Laboratories.

There are a number of communities in Manitoba which do not have ready access to testing facilities. A point-of-service testing program is an option for remote communities, where water samples can be

tested in a timely manner to ensure the results are meaningful. The use of point-of-service testing requires, however, proper training of operators and an integrated management and support infrastructure.

To address the need for quality laboratory and on-site testing services; *it is recommended that:*

22. ***The Province ensure all Manitoba communities have access to appropriate drinking water testing resources. Where remoteness or other factors limit access by communities to accredited laboratories:***

    a. ***on-site testing capabilities (equipment, training, reporting and staffing) should be considered and subsidized at the same rate provided others; and***
    b. ***where on-site testing of drinking water is recommended it should only be conducted in accordance with approved methodologies, have adequate on-going quality control monitoring, have technicians with adequate training and have organizational support and management of the programs and follow-up of results.***

23. ***The province require, by legislation, that all drinking water testing, (excluding approved on-site testing) be conducted by accredited laboratories using accredited bacteriological tests including total coliforms, fecal coliforms, heterotrophic plate count, E. coli and other specific pathogens of public health concern.***

Reporting requirements of private water systems: There is no legislative or formal reporting requirements established for laboratories with respect to positive bacterial test results for private domestic water systems. Presently, laboratories only report test results to the person who submitted the drinking water sample for testing.

It has been recommended in this report that laboratories be required to provide the Province with all test results so that the Province may monitor water quality and identify possible wide-spread health risks and aquifer contamination.

Reporting requirements of semi-public water systems: There is no legislative or formal reporting requirements established for laboratories with respect to positive bacterial test results for semi-public water systems. Presently, laboratories only report back the results of the test to the person who submitted the drinking water sample for testing.

This is a gap in the protection of public health and safety for those being served by semi-public water systems. This lack of a parallel tracking system of positive test results by the Province limits the Province's ability to identify risks to the public. (e.g. in hospitals and schools being exclusively served by wells)

Reporting requirements of public water systems. The reporting of positive bacterial test results, for a public water system, is governed by *The Public Health Act* and its regulations and by a contract between Manitoba Health and Enviro-Test Laboratories. Guidelines for reporting as also outlined in Guideline 98-02, "Guidelines for Public Water Systems".

Presently, Enviro-Test Laboratories phones positive bacterial test results directly to the assigned public health inspector who is responsible for notifying the public water system operator and local authorities

(Appendix 2). Exceptions to this are the Brandon and Selkirk public water system operators who are contacted directly by the laboratory of any positive test result.

If the public health inspector is unavailable Enviro-Test Laboratories contacts the secretary or regional supervisor in Manitoba Conservation. If direct personal telephone contact is not made a message is left on voice mail or a fax is forwarded. There is, however, no verification that the message / fax has been received, understood and acted upon.

Delays in notification could occur if the public health inspector is absent or unavailable. Also, it is sometimes difficult for the public health inspector to contact the water system operator. When this occurs, it is usual practice to contact someone in the municipal office. Problems and delays may also arise when positive results are received on a Friday and re-sampling and testing does not occur until the following Monday.

While most Manitoba Conservation regional offices recognize that notifying the water system operator of positive test results is a high priority, notification may be delayed due to limited staffing and delays in notification can result.

To address the need for effective and timely reporting procedures of positive bacterial test results, for both semi-public and public water systems, so timely follow-up actions can be taken; *it is recommended that:*

24. ***The Province establish a drinking water bacteriological test results reporting protocol, for all drinking water , which is to be followed by laboratories and on-site testing facilities. Such a protocol will establish, based upon the level of public safety at risk, to whom the results are to be forwarded, the time lines for reporting and the methods of communicating the test results.***

    Pending establishment of the protocol and provincial drinking water coordinating centre, positive bacteriological test results from semi-public and public drinking water supplies be reported as soon as practical:

    - ***to the person submitting the sample for testing, and***
    - ***in-person to the "live voice" of a local public health authority, i.e., a public health inspector or a medical officer of health.***

25. ***The province, in consultation with laboratories, establish a standard set of simple and clear interpretations of drinking water test results for private and semi-public water systems for use by laboratories in reporting back to those persons submitting a water sample for testing.***

26. ***The province work with laboratories to develop standardized forms / formats for the reporting of all drinking water bacteriological test results.***

IX. ACTIONS AFTER TEST RESULTS

A. Introduction

The final step in the process is the taking of necessary actions to address contamination problems.

In the review of follow-up actions, the following was investigated:

- the actions that occur when bacterial contamination is reported; and
- whether these actions were adequate to protect public health and safety and ensure the sustainability of provincial water supplies.

B. Background, Current Situation and Recommendations

The general actions taken when test results indicate bacterial contamination of drinking water supplies are very similar for all water systems. These actions may include:

- consideration of stopping the use of the water or boiling it prior to use;
- interpreting the laboratory test results to determine the appropriate remedial action;
- disinfecting the water system; and
- re-sampling and testing of the water.

If further test results are still positive for bacterial contamination, the actions noted above would be repeated / continued and, if necessary, further investigation to determine the source of the continuing contamination.

Private water systems. For private domestic water systems, the owner is responsible for taking action following receipt of positive laboratory test results for bacterial contamination. Private water systems are largely unregulated and owners are not required to advise the Province of any contamination of water supplies.

To address the need to provide owners of private domestic water systems with information on the actions to be considered when positive bacterial test results are received and the need to identify trends and patterns of bacterial presence in aquifers; *it is recommended that:*

27. The province develop one standard decision flow chart (algorithm) to be provided to well owners with their bacterial drinking water test results which will:

- ***c. outline recommended actions for well owners based on the type of well and level of contamination, and***
- ***d. provide information on how to get further assistance from public health inspectors and others so that specific advice can be given on a case-by-case basis, when requested by the well owner.***

28. The Province develop a program to track positive bacteriological test results to determine if there is widespread bacterial contamination of water supplies within an aquifer and have procedures in place to ensure appropriate action is taken by public health officials when such widespread contamination is suspected.

Semi-public water systems. For the most part, these systems are presently unregulated and as a general rule, the owner / operator of such a system is not required to advise the Province of positive bacterial test results. As with private domestic water services, the owner / operator of a semi-public water system is responsible for taking action following receipt of positive laboratory test results for bacterial contamination.

The unregulated environment in which semi-public water systems currently operate has already been identified in this report as a public health risk, particularly as users of such systems include schools, restaurants and hospitals.

To address the need for prescribed remedial actions for semi-public water systems: *it is recommended that:*

29. ***The Province develop protocols for follow-up actions for the semi-public water supplies which will:***

    a. ***outline recommended actions and procedures to be followed based on type of water source, facility and operation and level of contamination, by the owner / operator and provincial staff, and***
    b. ***provide the owner / operator with options for assistance.***

    Pending development of the protocol, the Province require all owner / operators of semi-public water supplies to immediately contact the local public health inspector or medical officer of health if a drinking water test sample result is positive for bacterial contamination to ensure monitoring of follow-up action.

Public water systems. The remedial actions to be taken upon receipt of positive bacterial test results for a public water system is governed by *The Public Health Act* and its regulations.

Guideline 98-02, "Guidelines for Public Water Systems: Chlorine Residual Testing and Reporting and Bacteriological Water Sampling, Submission and Interpretation" outline in section 6 the remedial actions that should be taken by an operator of a public water system and the responsibilities and actions of various provincial staff.

Upon notification of positive bacterial test results by the laboratory, the public health inspector calls the water treatment plant operator to discuss possible source contamination and advises remedial action, depending on the situation. Usually this involves immediate re-sampling by the operator and a check of the free chlorine level at the site of the positive sample result.

In cases of more severe contamination, other remedial actions range from increasing the chlorinator pump rates, isolating affected water lines and shock chlorinating, cleaning, and flushing to the complete shutdown of the water system along with notifications to the medical officer of health and appropriate public announcements.

In the opinion of the *Committee*, the guidelines and follow-up actions for public water systems, subject to recommendations of reporting in Section VII of this report, are adequate providing the procedures and actions are followed.

X. BACKGROUND MATERIALS

The following is a list of reports, papers, correspondence and legislation that were considered in whole or in part by the Drinking Water Advisory Committee and / or Subcommittee members in the during the preparation of this and subcommittee reports.

Provincial Legislation – Acts and Regulations:

The Public Health Act

- MR 324/88R – Ice Regulation
- MR 331/88R – Waterworks, Sewerage & Sewage Disposal
- MR 330/88R – Water Supplies Regulation
- MR 326/88R – Protection of Water Sources Regulation
- MR 339/88R – Food and Food Handling Establishments Regulation
- MR 327/88R - Recreational Camp Regulation

- Guideline 98-02, "Guidelines for Public Water Systems: Chlorine residual Testing and Reporting and; Bacteriological Water Sampling, Submission and Interpretation"
- Guidelines for the Construction of Bulk Water Fill Stations – July 1989

The Ground Water and Water Well Act

- MR 228/88R – Well Drilling Regulation
- MR 95/88R – Private Sewage Disposal Systems and Privies Regulation

The Workplace Safety and Health Act, Chapter W214

- MR 228/94 (Operation of Mines), section 34 (drinking water)

The Municipal Act
The Water Services Board Act
The Public Utilities Act

Federal and other Provincial Legislation, Acts, Regulations, Guidelines, Reports and Papers:

- Nova Scotia new Drinking Water Regulations.
- Ontario, new Drinking Water Regulations.
- Guidelines for Canadian Drinking Water Quality, Sixth Edition, 1996.
- Interim Protocol for Private Water Sample Results – Ontario Northwestern Health Unit, July 25, 2000.
- Federal - Provincial Subcommittee on Drinking Water. "Technical Advisory: Microbiological Safety of Drinking Water".
- Latest Draft re Microbiological Quality - Bacteriological Quality, October 1998.
- Paper: "Drinking Water Legislation / Regulations: Summary of Provincial and Territorial Programs" prepared for Federal-Provincial Subcommittee on Drinking water, December 1998.

First Nations Reports and Papers:

- Health Canada. paper: "Summary of Description of Drinking Water Quality and Monitoring by First Nations Environmental Health Services for First Nation Communities".
- Health Canada First Nation and Inuit Health, "Manitoba Community Drinking Water Microbiological Sampling Program".
- Health Canada, Medical Services Branch, Manitoba Region, "Manitoba First Nation: Cryptosporidium & Giardia Project" February 2000.
- First Nations Environmental Health Program, "Annual Report on the First Nations Drinking Water safety Program – Manitoba Region April 1/98 – March 31/99".
- Health Canada. paper "Manitoba First Nations Community Drinking Water Microbiological Sampling Protocol".

Reports and Articles:

- Canadian Water and Wastewater Association. "Manitoba Drinking Water Program Review". various reports, 1999.
- Articles from the Journal of American Water and Wastewater Association:

    - W. Bellamy, K.Carlson, D. Pier, J. Ducoste, and M. Carlson. "Determining disinfection needs". Volume 92, Issue 5.
    - AWWA Water Quality Division Disinfection Systems Committee. "Committee Report: Disinfection at small systems". Volume 92, Issue 5.
    - AWWA Water Quality Division Disinfection Systems Committee. "Committee Report: Disinfection at large and medium-size systems". Volume 92, Issue 5.
    - R. Green and L. Benjamin. "Small Systems in British Columbia".

Other Papers and Correspondence:

- E.A. Sorba. paper . "Laboratory Accreditation for Microbiological Analysis in Water". September 1, 2000.
- Enviro-Test Laboratories – compilation of drinking water testing protocols
- Municipal Water System Testing Protocol - Flow Diagram
- Private Well Water Testing Protocol - Flow Diagram
- Paper: Shock Chlorination Procedures
- Manitoba Health, paper "Data Summary of Water Line Calls – June 1, 2000 to August 17, 2000". Compiled by T. Carstens.
- G. Hammond August 21, 2000 Letter to Norwest Labs, BioQuest Labs and Enviro-Test Labs, Re: request for information.
- S. Dzogan, Enviro-Test Laboratories, August 31, 2000 letter Re: Weekly Microbiological Municipal Summary Reports.

Other:

- Latest Drinking Water Q & A's – Manitoba Health

APPENDIX 1

Summary of bacteriological testing protocols and methods used by Enviro-Test Laboratories.

Drinking Water Source	Test Parameter	Test Method	Result and Follow-up
Any source untreated (e.g., standpipe, lake, dugout, municipal, cistern)	Total coliform	MF and QT MF by Ag Latex detection for E. coli 0157	Negative- no further action Positive- remedial action and resample and test for total coliform and E. coli
Any source treated (e.g., standpipe, lake, dugout, municipal, cistern)	Total coliform and all organisms	MF and QT Pour Plate MF by Ag Latex detection for E. coli 0157	Negative- no further action Positive- remedial action and resample and test for total coliform and E. coli and/or fecal coliform
Well water untreated	Total coliform and E. coli	MF and QT MF by Ag Latex detection for E. coli 0157	Negative- no further action Positive- remedial action and resample for total coliform and E. coli
Well water treated	Total coliform, E. coli and all organisms	MF and QT Pour Plate MF by Ag Latex detection for E. coli 0157	Negative – no further action Positive – remedial action and resample for total coliform, E. coli and all organisms
MF – Membrane Filtration, QT – Quanti-Tray, Ag – Agglutination			

APPENDIX 2

Reporting procedure / protocol currently followed by Enviro-Test Laboratories.

Daily	Immediate phone call to the public health inspector in whose region there is a positive microbiological test result.
Weekly	Hard copy microbiological test summaries for all public water system are sent to each region of Manitoba Conservation, in order to provide a regional perspective and for historical records keeping purposes.
Monthly	Complete electronic reports of all test results are sent to Manitoba Conservation headquarters.
Quarterly	Complete electronic report of all test results are sent to Manitoba Conservation headquarters

See also Canadian Water and Waste Association Report of the Public Consultation, Laboratory Services, pp. 26